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# (54) Apparatus for dispensing a volatile material

(57) Apparatus for dispensing a volatile material comprises a core 13 containing the volatile material in liquid or solid form, an envelope 14 having apertures 15 containing said core and tear-away panel 16 covering the apertures in said envelope, the arrangement being such that removal of panel 16 enables the volatile material to be released into the atmosphere. The volatile material may comprise a perfume, deodorant, insecticide, pesticide or fungicide.

The breached apparatus may be placed in the dust bag of a vacuum cleaner so that, in use, the volatile material is dispensed through the exhaust of the cleaner into the surrounding atmosphere.

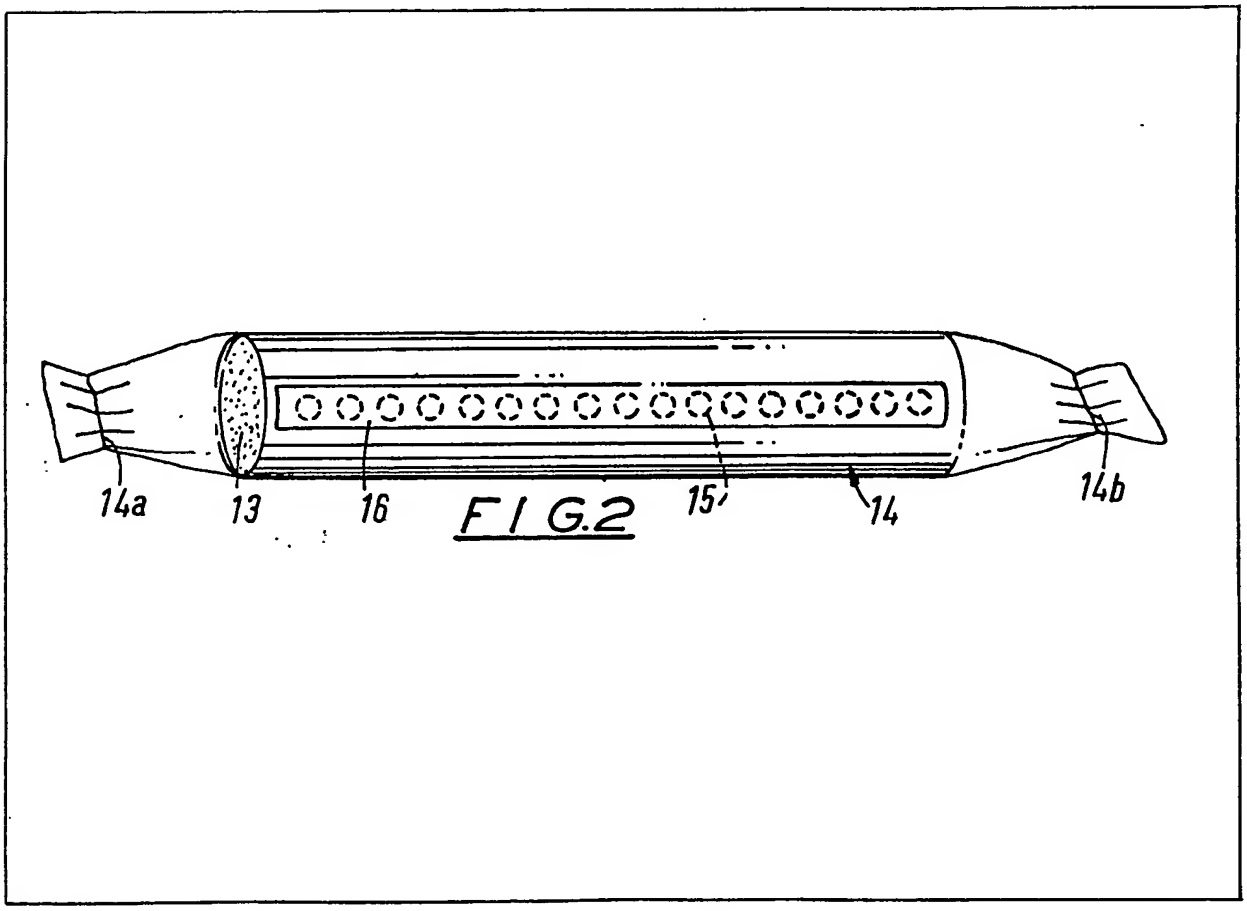


FIG.2

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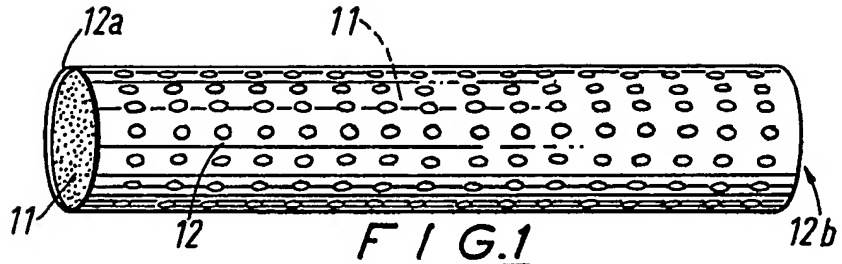


FIG.1

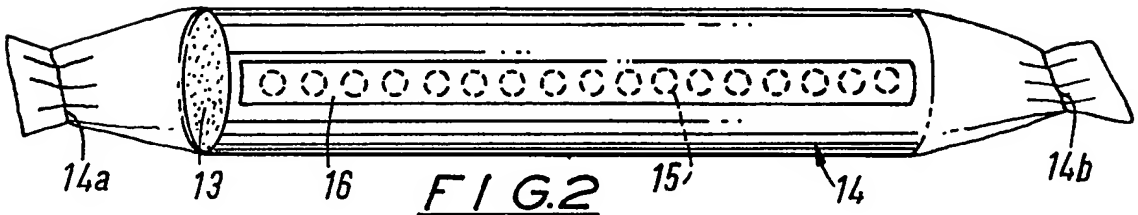


FIG.2

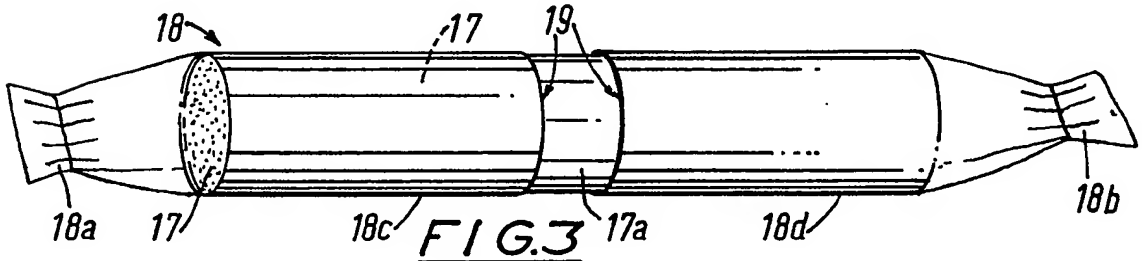


FIG.3

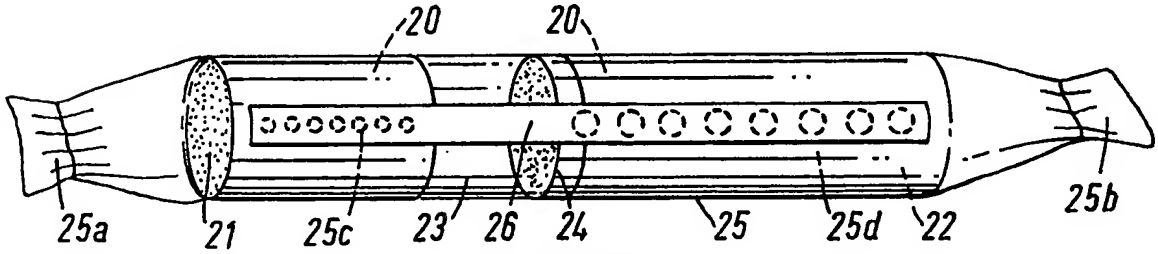


FIG.4

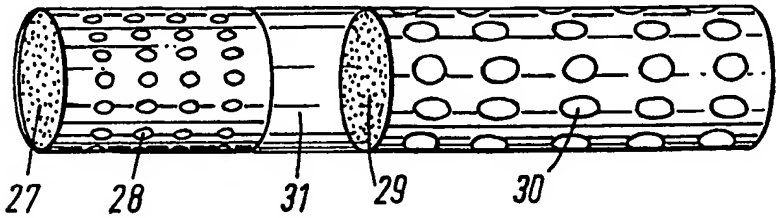


FIG.5

SPECIFICATION

**Apparatus for dispensing a volatile material**

This invention relates to apparatus for dispensing a volatile material and, more particularly, to an apparatus which permits a controlled release of the volatile material.

In this specification the term "a volatile material as hereinbefore described" means any compound or composition capable of maintaining a liquid or solids form when isolated from atmosphere and which evaporates or dissolves to a vapour or gaseous phase when exposed to atmosphere.

Preferably the volatile material comprises a perfume, deodorisor, or deodorant, but the material may comprise, or include, an insecticide, pesticide, or fungicide.

It is well known in the art to provide a reservoir of a volatile material, as hereinbefore described, within a rigid container and to allow the material to evaporate from the reservoir through a perforated or fibrous barrier or via a wick mechanism. Some degree of control of the release of material from the reservoir can be effected by providing the apparatus with means for varying the surface area of the barrier or the wick exposed to atmosphere.

A serious disadvantage with the prior art dispensing devices is that they require a rigid container for the reservoir and barrier or wick mechanism, and a separate packaging or sealing means for preventing loss of the volatile material during storage of the device.

The present invention seeks to provide apparatus for dispensing a volatile material, as hereinbefore defined, which does not require a rigid container.

A further objective of the present invention is to provide apparatus for dispensing a volatile material or volatile materials in a controlled manner and which apparatus, by virtue of its structure, can be used in locations and situations for which the rigid container dispenser is not suitable.

According to the present invention there is provided apparatus for dispensing a volatile material, as hereinbefore defined, comprising a core intended to store the said volatile material in a liquid or solids form, an impervious envelope containing said core and said material and normally isolating said core and said material from atmosphere, and means for breaching said envelope in such manner as to permit the evelope to contain or partially contain the said core whilst allowing a controlled release of said material to atmosphere.

The present invention thus proposes storage of the volatile material in a core within an envelope, the volatile material is released only when the envelope is breached and after it has been breached the evelope serves to "contain" the core and volatile material.

In one embodiment in accordance with the invention said core comprises a body of cylindrical configuration and said volatile material is stored within said body.

In a second embodiment in accordance with the invention said core comprises a plurality of bodies of cylindrical configuration and of substantially uniform diameter arranged in axial alignment. In this embodiment said volatile material may be stored within each cylindrical body or, when in a solids form such as a powder or granular form, the bodies may be axially spaced apart and the material stored in the spaces between said bodies.

When the core comprises two or more cylindrical bodes, the apparatus may include two or more volatile materials, stored in cylindrical bodies or, between cylindrical bodies and, conveniently, the cylindrical body or bodies, or the space or spaces between individual bodies, containing each material are physically isolated from the, or each, body or space containing a different material.

Preferably the core material comprises a cellular or fibrous material and, when of cellular construction, it will be appreciated that when the core is to contain the volatiled material within it the core will be of open cell construction but when the material is to be stored between adjacent cylindrical bodies the core may conveniently be of closed cell construction.

Preferably the core is contained in a perforated sleeve which affords a "first line" control for the release of volatile material from the core and, conveniently, the sleeve may be open at both ends.

In a preferred embodiment in accordance with the invention, and conveniently when the core presents a cylindrical configuration, the said envelope comprises a tubular element closed at both ends.

As an objective of this invention is to provide apparatus which does not require a rigid container, the term "envelop" when use in this specification means a non-rigid envelope and preferably said envelope is made from a thermoplastics material and the ends of the said tubular element are closed by heat sealing.

In one embodiment in accordance with the invention, and in particular in an embodiment wherein the core comprises a single body or a plurality of bodies within a perforated sleeve, the said means for breaching the envelope preferably comprises a tear line.

"Tear lines" are well known in the packaging art and may comprise a single line of weakness along which a material can be easily and readily ruptured. Frequently, however, two generally parallel lines of weakness are provided so that material between the lines of weakness can be readily ripped away to rupture the packaging.

Preferably the tear line, or tear lines, are continuous so that, when ruptured, the tear separates the envelope into two parts and more preferably the tear line or lines lie in a plane substantially at right angles to the axis of the tubular element part of the envelope and

substantially mid-way between the ends thereof. Thus, when such a preferred tear line is provided and the line is ruptured, the two halves of the envelope can be adjustably spaced apart to expose the core (or the perforated sleeve) therebetween and the envelope halves continue to contain the core outwardly of the exposed core or sleeve to ensure that volatile material escapes to the atmosphere only from the gap between the envelope halves.

In an alternative arrangement the envelope has one or a plurality of apertures therethrough and the means for breaching said envelope comprise a tear-away panel which normally covers said aperture or apertures and which, when torn away to expose the apertures, allows the volatile material to escape through said aperture.

Tear-away panels are well known in the art and generally comprise a flexible material secured, as by an adhesive, to an area of material surrounding an aperture so that when the panel is "torn" away from said area of material the aperture is exposed.

Preferably the envelope presents a plurality of apertures spaced apart in the axial direction of the apparatus and the tearaway panel, when applied to a plurality of apertures as proposed in this embodiment, has the additional advantage that the number of apertures exposed can be controlled and, thereby, the rate at which the volatile material is released to atmosphere can be controlled.

When the core is to contain different volatile materials in different locations along the axial length of the core the apertures in each axial length exposing a particular material will have a total cross-sectional area as desired to control the release of that material and thus, the apertures along the axial direction of the core may vary in cross-sectional area or spacing.

The invention will now be described further, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 shows, in perspective view, a core within a perforated sleeve,

Fig. 2 shows, a perspective view of a first embodiment of the invention,

Fig. 3 shows, in perspective view, a second embodiment in accordance with the invention,

Fig. 4 shows, in perspective view, a further embodiment in accordance with the invention and,

Fig. 5 shows, in perspective view, a core arrangement which may be used in the embodiment of Fig. 4.

In the embodiment illustrated in Fig. 1 a cylindrical core 11, storing a volatile material or materials, is contained with a perforated sleeve 12, the ends 12*a* and 12*b* of which are open.

The core 11 may be comprise a single cylindrical body within which a single volatile material is stored, in liquid or powder form, whereupon the material on evaporation may escape via the perforations in the sleeve 12 and the open ends of the sleeve 12.

Alternatively the core 11 may comprise a plurality of cylindrical bodies, of uniform diameter, arranged in axial alignment and the bodies may store the same volatile material or different volatile materials, in liquid or powder form. When different volatile materials are stored each body will store only one material, or the volatile material, in powder, granule or solid plug form may be stored between adjacent bodies.

When the core is other than a single cylindrical body the sleeve 12 can contain the bodies in the form of a single cylindrical body.

In the embodiment illustrated in Fig. 2 a core 13, which may be a single core such as the core 11 or an assembly of cylindrical bodies within a perforated sleeve 12 as defined above, or simply an assembly of cylindrical bodies with the volatile material stored therein, is contained within an envelope 14 of "see-through" thermoplastics material. The envelope 14 is basically formed as a tubular element having a circumference, in cross-section, only a little larger than the circumference of the core 13 so that the envelope 14 is a relatively tight fit on the core 13 contained therein. The envelope 14 has its ends 14*a* and 14*b* heat sealed.

The envelope 14 has a plurality of apertures 15, therethrough arranged in equally spaced apart relationship along the axial direction of the envelope 14. The apertures 15 are, as illustrated, covered with a tear-away panel 16.

Thus, when the tear-away panel 16 is in place and covering the apertures 15 the apparatus is in a "storage" condition wherein the interior of the envelope 14 is isolated from atmosphere. The apparatus is rendered "operational" by removing the tear-away panel 16 to expose aperture 15, whereupon the interior of the envelope is exposed to atmosphere through the apertures 15 and volatile material can evaporate or dissolve to a vapour or gaseous form to flow through the apertures 15 to the surrounding atmosphere.

The apparatus thus provides a compact, non-rigid assembly in which the envelope 14 effectively contains the volatile material in storage and in an "operational" condition of the apparatus serves to contain and support the core 13.

In the example illustrated in Fig. 3 the core 17, which may have the form of a single cylindrical body or a plurality of cylindrical bodies as described hereinbefore, with a perforated sleeve, such as the sleeve 12, is contained within an envelope 18 of see-through thermoplastics material defined by a tubular element with the ends 18*a*, 18*b* closed by heat-sealing.

The envelope 18 has a continuous tear-line 19, at right angles to the axis of the apparatus and mid-way between the ends of the core 17, so that when breached to separate the envelope 18 into diametrically opposite halves 18*c* and 18*d*, the two envelope halves can be axially displaced relative to one another to expose a mid-region 17*a* of core 17 to permit the evaporation of the volatile material therefrom.

In the example illustrated in Fig. 4. a core 20 comprises two spaced-apart cylindrical bodies 21

and 22, the volume between bodies 21 and 22 being identified by the numeral 23. The cylindrical body 22 contains a volatile material to be dispensed, a plug 24 isolates the body 22 from the volume 23, and the volume 23 is charged with a second volatile material in powder, granule, or solid plug form intended to evaporate and dissolve and escape to atmosphere only through the cylindrical body 21.

The core 20 is contained within an envelope 25, of tubular form, the ends 25*a* and 25*b* of which are closed by heat sealing.

A tear-away panel 26 applied to the envelope 25 and extending parallel to the axis of core 20 covers apertures 25*c* and 25*d* in the envelope.

It will be observed that the apertures 25*c* are limited to that axial length of the envelope 25 containing the cylindrical part 21 and the apertures 25*d* are limited to the axial length of envelope 25 containing cylindrical part 22, so that, when the tear-away panel 26 is removed, the volatile material in cylindrical part 22 can evaporate and escape through the apertures 25*d* to atmosphere whilst the solids material in the volume 23 can evaporate to escape from the apertures 25*c* via body 21.

It will be observed that the apertures 25*c* are smaller than the apertures 25*d* and are differently spaced apart so that the selection of the cross-sectional area of envelope 25 breached adjacent each cylindrical body 21 or 22 can be controlled to control the relative rate of evaporation of the different materials.

In the core arrangement illustrated in Fig. 5, a first cylindrical body 27 is retained in a first perforated sleeve 28, a second cylindrical body 29 is retained in a perforated sleeve 30, and the bodies 27 and 29 are spaced apart by a plug 31. The core is intended to be packaged in an envelope (not shown) identical with the evelope 25 illustrated in Fig. 4 with a tear-away panel 26, the body 27 is intended to store a first volatile material and the body 29 a second volatile material, and the plug 31 serves to prevent the release of volatile materials from the adjacent ends of bodies 27 and 29.

It will be observed that the body 29 is axially longer than body 27, so as to be capable of storing a greater volume of volatile material than the body 27, the cross-sectional areas of the apertures in sleeve 28 are smaller than the cross-sectional areas of the apertures in sleeve 30, and the spacing between the apertures in sleeve 28 are different from those in sleeve 30 so that the rate of release of volatile materials from the bodies 27 and 29 is different.

The cylindrical bodies described above, when intended to internally store a volatile material, are made from an absorbent material inert with respect to the material to be stored and, conveniently, such bodies may comprise open-cell or fibrous bodies. The volatile material may be charged into the cylindrical bodies by injection, dipping the bodies in a reservoir of material, or by any other means known in the art, for charging a plug.

For convenience in the drawings the perforated sleeves, such as the sleeves 12, 28 or 30, are illustrated with their respective lines of perforation parallel to their respective axes and the apertures 25*c* or 25*d* in envelope 25 also extend in the direction of the axis of the apparatus and it will be understood that the circumferential length of the apertures in said sleeves and the circumferential spacings between said apertures, and the circumferential length of the apertures in the envelope will be such that in all radial positions of the cylindrical bodies some part of a row of apertures in the, or each, enveloped cylindrical body will be exposed to the apertures in the envelope when the tear-away panel 26 is removed.

To ensure the free radial release of material through the apertures in a cylindrical body and the apertures in an envelope the lines of apertures in the perforated sleeve may not be parallel to the axis of the sleeve and, conveniently, may follow a spiral path based on the axis of the sleeve. Alternatively, the apertures in the envelope may follow a spiral path based on the axis of the apparatus.

Further, and to assist in the release of volatile material from the cylindrical bodies to the surrounding atmosphere the envelope may be a loose fit on the core and perforated sleeve so that a volume externally of the perforated sleeve but internally of the envelope may be charged with evaporated volatile material for release through the apertures in the envelope.

The envelope, such as the envelopes 14 and 25, are made from a material inert with respect to the volatile material and impervious to the volatile contents and, conveniently, are made from a thermoplastics film material, such as polythene.

It will be appreciated that when the envelope is breached by a continuous tear-line, such as is illustrated in Fig. 3, the two parts of the envelope can be independently axially displaced to increase or reduce, the area of core (or the perforated sleeve containing the core) exposed therebetween to control the rate of release of volatile material from the apparatus but the two halves of the envelope continue to "contain" the core. In like manner it will be appreciated that when the envelope is breached by removal of a tear-away panel, such as the panel 26 shown in Fig. 4, the envelope continues to contain the core so that the envelope serves two basic purposes.

(1) To wholly contain the core and prevent the release of volatile material or materials in an unbreached condition of the envelope (storage condition).

(2) To partially contain the core and to control the rate of release of volatile material when the envelope is breached (condition in use).

Whilst the apparatus proposed hereinbefore provides an inexpensive but nevertheless controllable apparatus for releasing volatile material to the atmosphere and has many obvious applications and uses the apparatus is particularly

useful in a hitherto little explored field, namely, the release of volatile material into the air flows through a vacuum cleaner to rapidly dispense the volatile material throughout the atmosphere of a room being cleaned.

In this special use, the apparatus with the envelope breached, is simply inserted into the dust bag of the vacuum cleaner, in the relatively still atmosphere in the dust bag as will exist when the cleaner is not in use the release of volatile material will be relatively slow but, when the cleaner is in use, the air flows around the apparatus will cause an increase in the rate of release of the volatile material or materials and the evaporated volatile material or materials will be carried by the air flows through the dust bag out of the exhaust of the cleaner to the surrounding atmosphere.

Whilst the present invention has been described by way of example with reference to specific embodiments the invention is not restricted thereto and many modifications and variations within the scope of the appended claims will be apparent to persons skilled in the art.

CLAIMS

1. Apparatus for dispensing a volatile material, as hereinbefore defined, comprising a core intended to store the said volatile material in a liquid or solids form, an impervious envelope containing said core and said material and normally isolating said core and said material from atmosphere, and means for breaching said envelope in such manner as to permit the envelope to contain or partially contain the said core whilst allowing a controlled release of said material to atmosphere.

2. Apparatus as claimed in claim 1 in which said core comprises a body of cylindrical configuration and said volatile material is stored within said body.

3. Apparatus as claimed in claim 1 in which said core comprises a plurality of bodies of cylindrical configuration, and of substantially uniform diameter arranged in axial alignment.

4. Apparatus as claimed in claim 3 in which said volatile material is stored within each, or selected, bodies.

5. Apparatus as claimed in claim 3 or 4 in which at least two different volatile materials, as hereinbefore defined, are stored in said core and said volatile materials are each stored in one or more cylindrical bodies individual thereto.

6. Apparatus as claimed in claim 5 in which the cylindrical body or bodies containing each material are physically isolated from the, or each body containing a different material.

7. Apparatus as claimed in claim 3 in which said bodies are axially spaced apart and said volatile material, or volatile materials as hereinbefore defined, are stored between said bodies.

8. Apparatus as claimed in any preceding claim in which the core material comprises a cellular or fibrous material.

9. Apparatus as claimed in any preceding claim in which the core, and the stored volatile material, are contained within a perforated sleeve and the sleeve is open at both ends.

10. Apparatus as claimed in any preceding claim in which said envelope comprises a tubular element closed at both its ends.

11. Apparatus as claimed in claim 10 in which the envelope is made from a thermoplastics material and the ends of the said tubular element are closed by heat sealing.

12. Apparatus as claimed in any preceding claim in which the said means for breaching the envelope comprises a continuous tear line.

13. Apparatus as claimed in claim 12 when dependent upon claims 10 or 11 in which the tear line lies in a plane substantially at right angles to the axis of the tubular element and substantially mid-way between the ends thereof.

14. Apparatus as claimed in any one of claims 1 to 11 inclusive in which the envelope has one or a plurality of apertures therethrough and the means for breaching said envelope comprise a tear away panel which normally covers said aperture or apertures and which, when torn away to expose the apertures, allows the volatile material to escape through said aperture.

15. Apparatus as claimed in claim 14 in which the envelope presents a plurality of apertures spaced apart in the axial direction of the apparatus.

16. Apparatus as claimed in claim 15 in which the total cross-sectional area of all the apertures opening to one material is different from that opening to other materials.

17. Apparatus, substantially as hereinbefore described with reference to and as illustrated in Figs. 2, 3, 4 and 5 of the accompanying drawings.

18. Apparatus as claimed in any preceding claim in combination with a vacuum clearner, the apparatus being located in the dust bag of the cleaner and the envelope of the apparatus being breached.

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